LOOKING OVER

Great Bay

Overwintering Bald Eagles on New Hampshire's Seacoast

Great Bay can be a forlorn place during the winter, when arctic air settles over southern New Hampshire and northwest winds whip the bay's water into swells and whitecaps, driving salt spray into fringing marshes and forests. Its salt marshes and tidal creeks are bleak and quiet, save for crackling ice, incessant rattling of dead *Spartina* in the high marsh, and an occasional gull buffeted by winter winds as it scavenges the shoreline. Most transient fish — shad, alewife, striped bass — have long since left for the open Atlantic, until molecules, magnetism or predatory instincts compel them to return to New Hampshire's estuaries and rivers. Resident creatures have slowed their metabolism, some retreating deep in the mud to escape freezing, others moving and eating sparingly — just *getting by* until spring arrives and the bay awakens.

© JERRY AND MARCY MONKMAN PHOTOECOPHOTOGRAPHY.COM

During especially cold, snowy winters, more eagles seek shelter near the coastal waters of Great Bay. In 2002-2003, a record 16 eagles stayed.

Most people also retreat from the bay in the winter — their boats are in driveways and parking lots, fishing gear in basements, binoculars and field guides on windowsills. A few hardy souls still harvest shellfish in Little Bay, navigate its open waters in their boats, or enjoy the quiet solitude of the bay with a hike at Sandy Point or Adams Point.

Perhaps the most honored winter residents of Great Bay are bald eagles. Even the wimpiest of human souls will put on extra layers of clothing and leave their warm homes to stand in the numbing cold to see a distant bald eagle soaring over the bay, plummeting toward the water to grasp its prey. Bald eagles elicit a response unlike most of the region's wildlife. Perhaps we rejoice in their recovery; a few decades ago, eagles were nearly lost because of habitat loss, human disturbance and contamination of lands and waters with pesticides, chemical pollutants and heavy metals. (Federal protections have helped bald eagles rebound, though they are still listed as endangered in New Hampshire and threatened throughout the continental U.S.) Perhaps seeing a large carnivore on the hunt — without us being the hunted — stirs a carnal emotion in us. Or perhaps bald eagles are simply beautiful, and they remind us of the diversity of creatures with which we share our environment.

A HAVEN FROM WINTER'S WORST WEATHER

The number of bald eagles that spend their winters near Great Bay varies from year to year. During winters when arctic air sets up early and inland lakes freeze hard before Christmas, more eagles are forced to the coast to find food. The winter of 2002-2003 was one of the coldest and snowiest on record, and Chris Martin, a raptor biologist with the Audubon Society of New Hampshire, reported that 16 eagles were seen overwintering near Great Bay — the highest number ever recorded. During mild winters, eagles will stay inland or in estuaries to the north and east, resulting in fewer eagle sightings in Great Bay. The winter of 2001-2002 was mild and only six eagles were seen near Great Bay. In the last 15 years, the fewest eagles seen overwintering were two, in 1993.

continued on next page

© BILL SILLIKER JR. PHOTO

Eagle eye: When not feeding, wintering eagles conserve energy by finding a high perch with a commanding view.

There are many reasons to be hopeful about Great Bay. Cooperation among natural resource groups and citizens will help improve the management of New Hampshire's habitats and wildlife.

continued from previous page

Overwintering eagles need a few basic things: food, water, shelter and freedom from disturbance. During the winter, eagles feed primarily on dead fish, dead or injured waterfowl and dead mammals such as deer or even seals. Of these, waterfowl are perhaps the most reliable food source in Great Bay. While most waterfowl that travel south along the Atlantic flyway continue southward to warmer waters of the Chesapeake Bay, fewer than 0.5% – or about 8,000 last year – overwinter in New Hampshire, especially along the seacoast in Great Bay and Hampton Harbor. New Hampshire's estuaries provide ice-free conditions and important waterfowl foraging areas in their salt marshes, tidal flats and eelgrass beds.

Eagles generally avoid high-energy activities, such as active fishing, during the winter, because they need to conserve energy to stay warm. They will seek out easy and reliable sources of food, and return to the same locations each day until the food is depleted. They may travel several miles a day, scanning the waters, marshes and uplands of Great Bay, Little Bay and Hampton Harbor for food. When they aren't feeding or traveling to feeding areas, they are usually perched on tall trees or structures that provide panoramic views of the surroundings. Biologists call these *diurnal perches*, and they are an important way for eagles to keep tabs on feeding opportunities without having to waste energy. Winter survival is all about conserving precious calories.

As a rule, bald eagles avoid each other's company. Nevertheless, one interesting aspect of the birds' wintering behavior is that they will tolerate each other to share the most protected and comfortable stands of trees at night — this is called *communal roosting*. In the evening twilight, when winds calm and stars begin to reflect on the bay's subsiding waters, eagles commute across the darkening skies to their treetop roosts. Patient observers can often see six to eight eagles arrive at the roost before dark. Roosts are usually located in large trees with strong horizontal branches, protected from strong northwest winds, near feeding areas (but not always), and receive early morning sunlight to warm the birds.

Eagles are vulnerable to human disturbance while on their roosts. Vehicles, boats, snowmobiles or passers-by that approach roosts during the evening, night or early morning will often cause eagles to flee. If disturbance continues, eagles may abandon otherwise favorable roosts and find more protected locations. One study showed that eagles became alarmed when people were within a half-mile of a roost, and a different study showed that only 50% of eagles tolerated disturbances within 500 feet. Such studies teach us that we should observe and admire eagles from a distance, so that our presence does not threaten them. The studies also show the importance of locating and protecting roost sites.

MANAGING FOR HABITAT HEALTH

Overwintering eagles have used one very important communal roost site on Great Bay for many years. The land was purchased from a private landowner in the late 1980s with money from the New Hampshire Land Conservation Investment Program (LCIP) and is now managed by New Hampshire Fish and Game. This was one of the first LCIP purchases in New Hampshire, and has been important in helping to preserve and protect overwintering eagles on Great Bay. The location of this site is not publicly advertised to ensure sustained use of the roost area.

Conservation groups are working to protect the fragile ecosystem of Great Bay, so that bald eagles and other threatened species can continue to thrive here.

Ongoing eagle research and management in New Hampshire is done through a three-way partnership between Fish and Game, the Audubon Society of New Hampshire and the U.S. Fish and Wildlife Service. While much effort is spent on monitoring breeding pairs, there is also concern about overwintering eagles in Great Bay and other overwintering areas in New Hampshire, such as the lower Merrimack River, the Lakes region and the Connecticut River Valley. According to N.H. Audubon's Chris Martin, one of the biggest challenges is identifying and protecting overnight roosts from temporary disturbances and from long-term land use changes, especially in rapidly urbanizing areas near the Merrimack River and Great Bay.

Although winter roosts are essential for eagles, it is perhaps more important to consider the health of the entire Great Bay ecosystem. Great Bay is simply a place where waters meet. The ability of these waters to support a healthy food web — from bacteria to bald eagles — depends on what enters the water from the watershed and the air. The connection between seemingly unrelated things becomes more apparent when we start "from the bottom" and consider how energy flows through ecosystems, and the environmental requirements of plants and animals at every step along the way. For example, nitrogen runoff from lawn fertilizers and other sources increases pro-

© JERRY AND MARCY MONKMAN PHOTOECORHTOGRAPHY.COM

duction of microorganisms and bacteria in the estuary... which may cloud and decrease oxygen in the water... which in turn may cause eelgrass to decline... which in turn may decrease habitat and food for fish and waterfowl — which eagles depend on for food. In other words, it is not enough to think about what an eagle needs, but also what its prey needs, and what its prey's prey needs, and so on!

While Great Bay is important habitat for eagles in winter, it also seems to have everything that nesting eagles would need for year-round living, according to John Kanter, coordinator of Fish and Game's Nongame and Endangered Wildlife Program. "Biologists keep a watchful eye for signs that a couple of birds that spent the winter will stay to establish a permanent nest territory some day," he says. After all, remarks Kanter, "good eagle habitat is good eagle habitat," and Great Bay fits all the criteria.

THE CHANGING NATURE OF GREAT BAY

Humans are rapidly changing the nature of Great Bay's watershed. These changes range in scale from molecules to ecosystems — from the concentration and cycling of elements such as oxygen and nitrogen, to the abundance and diversity of native wildlife. Most of the changes are ultimately tied to human population density, and since coastal New Hampshire remains one of the fastest growing areas of the United States, the quality of its estuaries will continue to be challenged in coming decades.

More than half of New Hampshire's tidal shorelines are undeveloped, yet are unprotected from development, according to the New Hampshire Estuaries Project — meaning that waterfront development is bound to continue. Urban sprawl has increased in 60% of New Hampshire's coastal watershed towns, where over 11,000 acres of impervious surfaces (such as roads, parking lots, building roofs) were added between 1990 and 2000. Bald eagles and other fish-eating wildlife such as loons and ospreys remain at risk because of harmful chemicals in fish tissue.

There are many reasons to be hopeful about Great Bay. Cooperation among natural resource groups and citizens will help improve the management of New Hampshire's habitats and wildlife. The Great Bay Resource Protection Partnership — with its members from N.H. Fish and Game, The Nature Conservancy, the Audubon Society of New Hampshire, Ducks Unlimited and others — is working to protect ecologically sensitive land around Great Bay. Environmental awareness among New Hampshire's citizens is growing, as is public support for initiatives that protect or restore the state's natural resources. Salt marshes are being restored, land is being purchased for open space and wildlife habitat and communities are being designed in innovative ways to protect local water quality. Young children are learning words like "ecosystems" and "conservation" and will be in a better position to inherit and become stewards of New Hampshire's wild places. As long as we look after Great Bay's natural resources and help preserve the area's vitality, majestic bald eagles will continue to spend their winters soaring along New Hampshire's coast — living proof that our efforts can enable them to thrive here for generations to come. WJ

The preparation of this article was funded in part by a grant from the Office of State Planning and Energy Programs, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA17OZ1129.

PHOTO COURTESY OF N.H. AUDUBON

Armed with binoculars and spotting scopes, volunteers in the Wintering Bald Eagle Monitoring Project collect data on bald eagle wintering activities. Fish and Game and N.H. Audubon use the information in ongoing efforts to protect sensitive eagle habitat.